

What is claimed is:

1. An illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between a pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror, said illumination device being characterized in that

a second reflecting mirror that encloses a front portion of said light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror is fixedly attached to at least one of said sealing member and said transparent plate,

said transparent plate and said second reflecting mirror are brought into contact or mounted in a fixedly attached condition, and at least one of said transparent plate and said second reflecting mirror is brought into contact or fixedly attached to said sealing member.

2. The illumination device according to claim 1, characterized in that said fixed attachment is carried out with an adhesive.

3. The illumination device according to claim 2,

characterized in that said adhesive is an aluminum nitride-based adhesive or an adhesive based on a mixture of silica and alumina.

4. The illumination device according to claim 1, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

5. The illumination device according to claim 1, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

6. The illumination device according to claim 1, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

7. The illumination device according to claim<sup>1</sup>, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.

8. An illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between said pair of electrodes and sealing members located on both sides of

said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror, said illumination device being characterized in that

a second reflecting mirror that encloses a front portion of said light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror is fixedly attached to said transparent plate, and

a gap is provided between said transparent plate, said second reflecting mirror, and said light-emitting tube.

9. The illumination device according to claim 8, characterized in that said fixed attachment is carried out with an adhesive.

10. The illumination device according to claim 8, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

11. The illumination device according to claim 8, characterized in that a substrate of said second reflecting mirror is composed of either a material with a

low thermal expansion coefficient or a material with a high thermal conductivity.

12. The illumination device according to claim 8, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

13. The illumination device according to claim 8, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.

14. An illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between said pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror, said illumination device being characterized in that

a substrate of said second reflecting mirror that encloses a front portion of said light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror is formed integrally with said transparent plate.

15. The illumination device according to claim 14, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

16. The illumination device according to claim 14, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

17. The illumination device according to claim 14, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

18. The illumination device according to claim 14, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.

19. An illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between a pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the

light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror, said illumination device being characterized in that

it comprises a second reflecting mirror that encloses a front portion of the light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror, and

said second reflecting mirror is disposed opposite to the outer peripheral surface of said light-emitting member with a gap being formed therebetween and is fixedly attached by being pressed against the outer periphery of said sealing member in the vicinity of said light-emitting member with a spring wound around the outer peripheral surface with a gap therebetween.

20. The illumination device according to claim 19, characterized in that said spring is composed of an electrically conductive coil and one end of said electrically conductive coil is connected to a lead wire led out from a sealing member on the side opposite to that where said spring is disposed.

21. The illumination device according to claim 19, characterized in that said transparent plate is fixedly attached to said sealing member with an adhesive.

22. The illumination device according to claim 19, characterized in that said transparent plate is composed

of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

23. The illumination device according to claim 19, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

24. The illumination device according to claim 19, characterized in that said adhesive is an aluminum nitride-based adhesive or an adhesive based on a mixture of silica and alumina.

25. The illumination device according to claim 19, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

26. The illumination device according to claim 19, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.

27. A projector comprising an illumination device and a light modulation device for receiving an incident light from said illumination device and modulating said incident light according to the given video information, characterized in that

said illumination device is an illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between a pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror,

a second reflecting mirror that encloses a front portion of said light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror is fixedly attached to at least one of said sealing member and said transparent plate,

said transparent plate and said second reflecting mirror are brought into contact or fixedly attached, and at least one of said transparent plate and said second reflecting mirror is brought into contact or fixedly attached to said sealing member.

28. The illumination device according to claim 27, characterized in that said fixed attachment is carried out with an adhesive.

29. The illumination device according to claim 27, characterized in that said adhesive is an aluminum



nitride-based adhesive or an adhesive based on a mixture of silica and alumina.

30. The illumination device according to claim 27, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

31. The illumination device according to claim 27, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

32. The illumination device according to claim 27, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

33. The illumination device according to claim 27, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.

34. A projector comprising an illumination device and a light modulation device for receiving an incident light from said illumination device and modulating said incident light according to the given video information, characterized in that

said illumination device is an illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between said pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror, and

a second reflecting mirror that encloses a front portion of said light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror is fixedly attached to said transparent plate, and

a gap is provided between said transparent plate, said second reflecting mirror, and said light-emitting tube.

35. The illumination device according to claim 34, characterized in that said fixedly attached attachment is carried out with an adhesive.

36. The illumination device according to claim 34, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a

high thermal conductivity.

37. The illumination device according to claim 34, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

38. The illumination device according to claim 34, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

39. The illumination device according to claim 34, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.

40. A projector comprising an illumination device and a light modulation device for receiving an incident light from said illumination device and modulating said incident light according to the given video information, characterized in that

said illumination device is an illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between said pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube,

reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror, and

a substrate of said second reflecting mirror that encloses a front portion of said light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror is formed integrally with said transparent plate.

41. The illumination device according to claim 40, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

42. The illumination device according to claim 40, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

43. The illumination device according to claim 40, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

44. The illumination device according to claim 40, characterized in that one end of said sealing member protrudes from the region surrounded by said first

reflecting mirror and said transparent plate through said transparent plate into an open region.

45. A projector comprising an illumination device and a light modulation device for receiving an incident light from said illumination device and modulating said incident light according to the given video information, characterized in that

said illumination device is an illumination device comprising a light-emitting tube having a light-emitting member in which light emission is carried out between a pair of electrodes and sealing members located on both sides of said light-emitting member, a first reflecting mirror for holding said light-emitting tube, reflecting the light emitted from said light-emitting tube, and directing the light forward, and a transparent plate disposed in the distal end portion of said first reflecting mirror,

said illumination device comprises a second reflecting mirror that encloses a front portion of the light-emitting member and reflects the light from said light-emitting member toward said first reflecting mirror, and

said second reflecting mirror is disposed opposite to the outer peripheral surface of said light-emitting member with a gap being formed therebetween and is

fixedly attached by being pressed against the outer periphery of said sealing member in the vicinity of said light-emitting member with a spring wound around the outer peripheral surface with a gap therebetween.

46. The illumination device according to claim 45, characterized in that said spring is composed of an electrically conductive coil and one end of said electrically conductive coil is connected to a lead wire led out from a sealing member on the side opposite to that where said spring is disposed.

47. The illumination device according to claim 45, characterized in that said transparent plate is fixedly attached to said sealing member with an adhesive.

48. The illumination device according to claim 45, characterized in that said transparent plate is composed of either a transparent material with a low thermal expansion coefficient or a transparent material with a high thermal conductivity.

49. The illumination device according to claim 45, characterized in that a substrate of said second reflecting mirror is composed of either a material with a low thermal expansion coefficient or a material with a high thermal conductivity.

50. The illumination device according to claim 3 or 9, characterized in that said adhesive is an aluminum

nitride-based adhesive or an adhesive based on a mixture of silica and alumina.

51. The illumination device according to claim 45, characterized in that a heat radiation fin is provided at the outer peripheral portion of said transparent plate.

52. The illumination device according to claim 45, characterized in that one end of said sealing member protrudes from the region surrounded by said first reflecting mirror and said transparent plate through said transparent plate into an open region.